

Making Sustainable Buildings A Reality

Adapted from a presentation to the White House
Summit on Federal Sustainable Buildings
January 2006

Governor's Office of Energy Policy
Division of Renewable Energy and
Energy Efficiency



“Sustainable Building”

**What comes
to mind...?**



PERCEPTION



REALITY

Bank of America Tower
at One Bryant Park
The Durst Organization
Cook+Fox Architects
New York NY
LEED-NC Registered:
Platinum Certification goal



© dbox

Case Study

U.S. Department of Transportation

Lakewood CO
New construction
LEED v2 Silver
128,000 sq ft



Case Study Toyota Motor Sales

South Campus
headquarters
Torrance CA
Commercial
Office Renovation
LEED-NC Gold



Case Study **Berea College**

Lincoln Hall
Berea KY
Administration
Building Renovation
LEED-NC Silver



Case Study

**Kenton County
School District**

Caywood Elementary

Crestview Hills KY

Public School

ENERGY STAR

Certified



“Sustainable buildings use resources—energy, water, materials, and land—more efficiently and effectively than buildings that are simply built to code.”

The Cost and Benefits of Green Buildings, 2003



Bernheim Forest Visitor Center –
LEED Registered

“Building to code is the worst building you can legally build...”

Impact of Buildings*

- 65.2% of total U.S. electricity consumption
- > 36% of total U.S. primary energy use
- 30% of total U.S. greenhouse gas emissions
- 136 million tons of construction and demolition waste in the U.S. (approx. 2.8 lbs/person/day)
- 12% of potable water in the U.S.
- 40% (3 billion tons annually) of raw materials use globally
- People spend 90% of their time indoors

* Commercial and residential

What is a Sustainable Building?

Design and construction practices that meet specified standards, resolving much of the negative impact of buildings on their occupants and on the environment.



Benefits of Sustainable Buildings

- Reduce the impacts of natural resource consumption
- Enhance occupant comfort, health and productivity
- Minimize strain on local infrastructures and improve quality of life
- Increase building valuation and ROI
- Integrated design allows high benefit at low cost by achieving synergies between disciplines and between technologies
- Increase occupancy and lease rates
- Makes a visionary statement about the community

The Triple Bottom Line.

Reduced Environmental Impact.
Peak Efficiency.

Improved Capitalization Rates.
Increased Marketability.
Higher Lease Rates.

Improved Productivity.
Reduced Absenteeism.

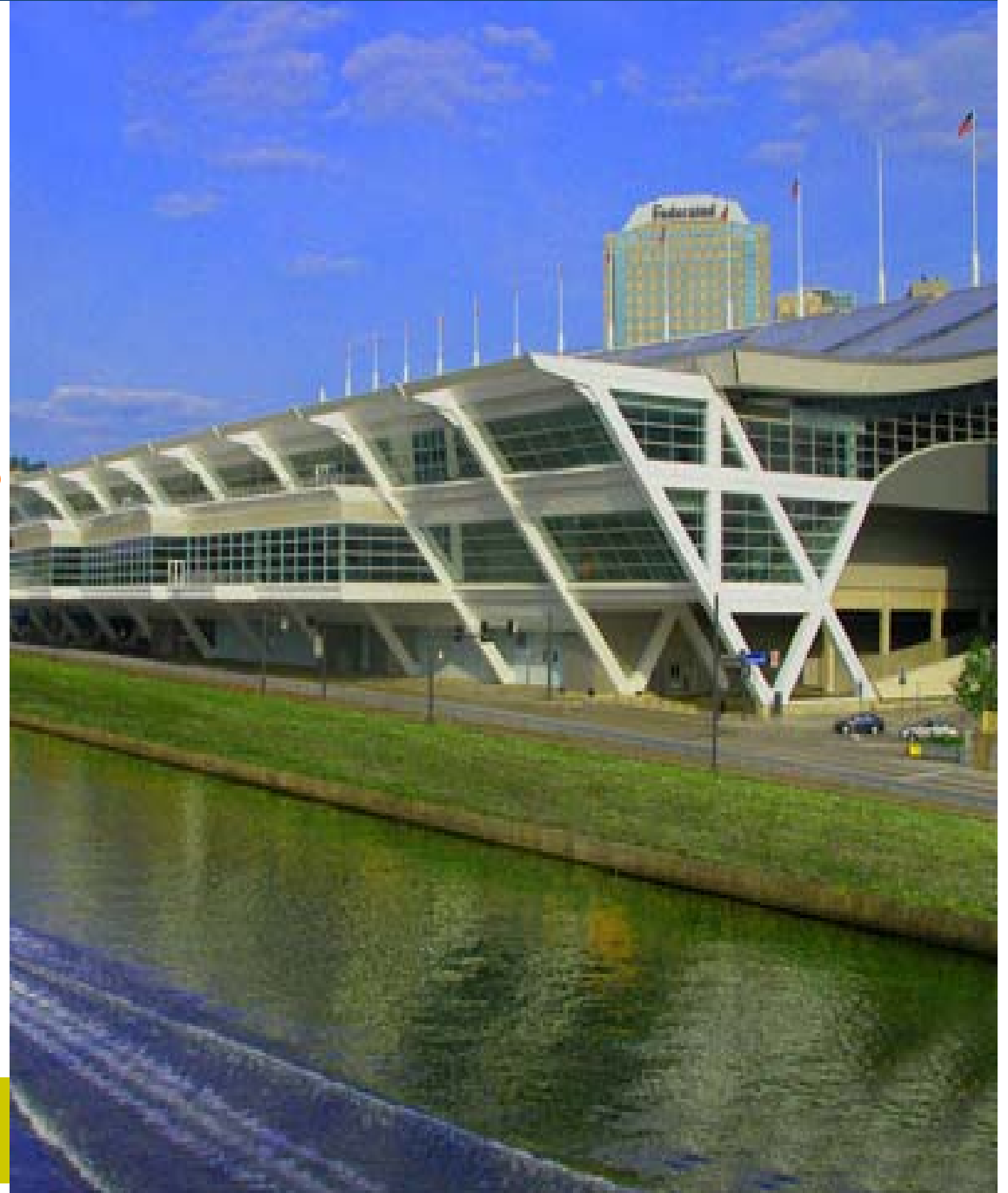
Build Green.
Everyone Profits.



Great....

But what about the
extra up-front
costs of building green?

David L. Lawrence Convention
Center Pittsburg, PA - LEED Gold



Results of the
California Study

33

Diverse Buildings

Built over the last

10

years

1.8%

Cost construction premiums of



Results of the
California Study

5=\$0

Five buildings had no cost increase at all.



EPA Science and
Technology Center
Kansas EPA
Kansas City KS
LEED-NC Gold

A \$4 investment per square foot
in building green nets
a \$58 benefit per square foot
over 20 years

\$0.50
WATER
SAVINGS

\$1.20
EMISSIONS
SAVINGS

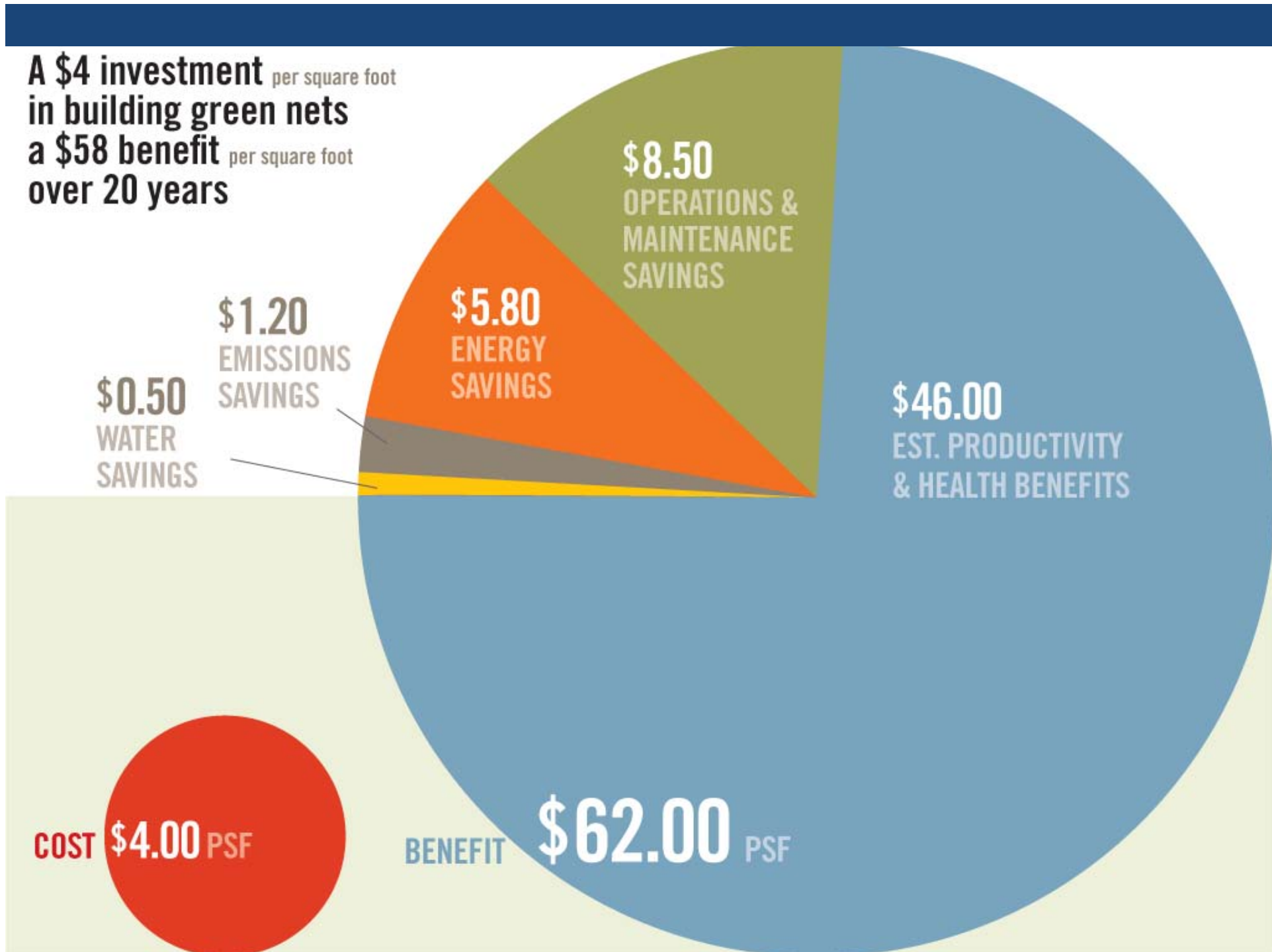
\$5.80
ENERGY
SAVINGS

\$8.50
OPERATIONS &
MAINTENANCE
SAVINGS

\$46.00
EST. PRODUCTIVITY
& HEALTH BENEFITS

COST \$4.00 PSF

BENEFIT \$62.00 PSF



**Results of the
California Study:
Average Bottom
Line Savings**



**ENERGY
SAVINGS
30%**

The graphic for Energy Savings features an orange background with a faint image of a power line tower. A large, light-colored upward-pointing arrow is positioned at the bottom of the panel.



**WATER
USE
SAVINGS
30-50%**

The graphic for Water Use Savings features a blue background with a faint image of a glass of water. A large, light-colored upward-pointing arrow is positioned at the bottom of the panel.



**WASTE
COST
SAVINGS
50-97%**

The graphic for Waste Cost Savings features a blue background with a faint image of a recycling symbol. A large, light-colored upward-pointing arrow is positioned at the bottom of the panel.



Results of the
California Study:
Average Bottom
Line Savings

GREEN IMPROVEMENTS PAY FOR
THEMSELVES IN **3** YEARS

(ANNUAL RETURN ON INVESTMENT IS 25–40%)



The William and
Flora Hewlett
Foundation
Menlo Park CA
LEED-NC Gold

Case Study
**U.S. Department
of Transportation**

Lakewood CO
New construction
LEED v2 Silver
128,000 sq ft

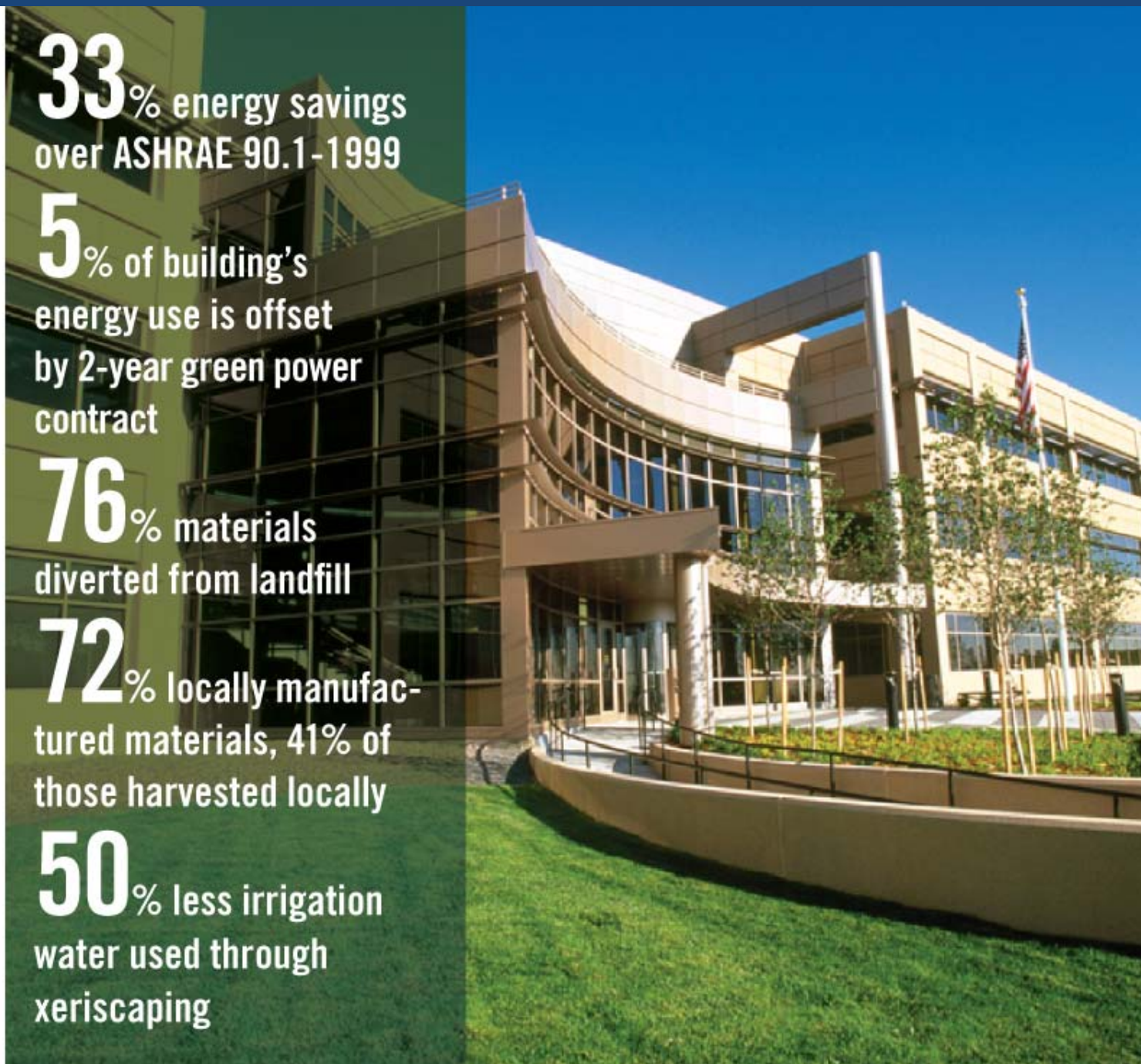
33% energy savings
over ASHRAE 90.1-1999

5% of building's
energy use is offset
by 2-year green power
contract

76% materials
diverted from landfill

72% locally manufac-
tured materials, 41% of
those harvested locally

50% less irrigation
water used through
xeriscaping



Case Study Toyota Motor Sales

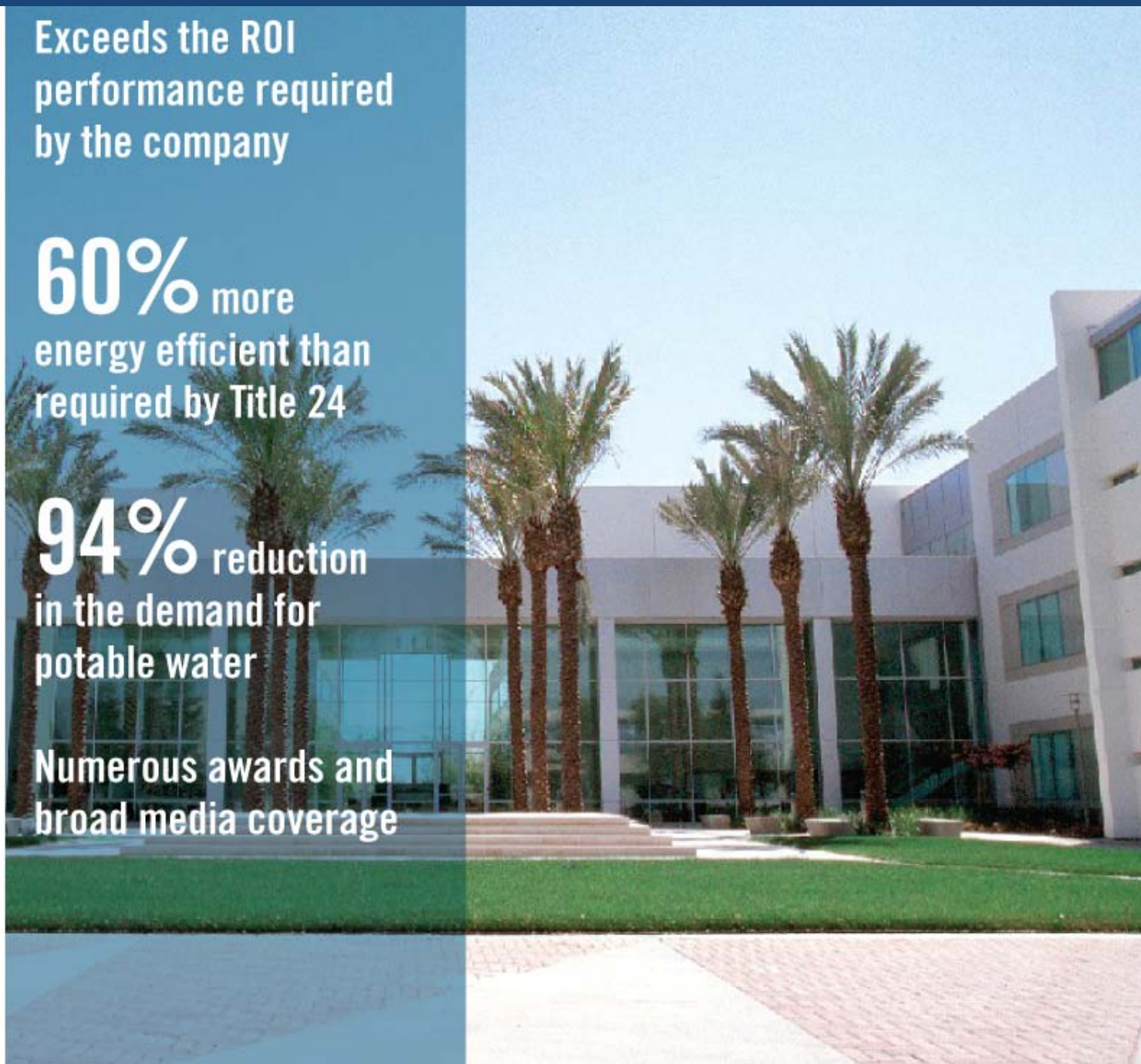
South Campus
headquarters
Torrance CA
Commercial
Office Renovation
LEED-NC Gold

Exceeds the ROI
performance required
by the company

60% more
energy efficient than
required by Title 24

94% reduction
in the demand for
potable water

Numerous awards and
broad media coverage



Case Study
Berea College

Lincoln Hall
Berea KY
Administration
Building Renovation
LEED-NC Silver

75% of the building's
structure reused

50% diversion of
construction debris

35% reduction in energy
costs

30% reduction in
potable water consumption



Case Study
Kenton County
School District

Caywood Elementary
Crestview Hills KY
Public School
ENERGY STAR
Certified

47% reduction in
energy consumption

44% reduction in
energy costs

\$45,700 annual
energy savings



Sustainable Building Protocols



ENERGY STAR CERTIFICATION
ENERGY STAR Program
U.S. DOE/ EPA



**Leadership in Energy and Environmental
Design (LEED) CERTIFICATION**
US GREEN BUILDINGS COUNCIL
(USGBC)

ENERGY STAR BULIDINGS



ENERGY STAR is a government-backed program helping businesses and individuals protect the environment through superior energy efficiency.

- **Focus is to improved building energy efficiency**
- **Establishes benchmarks, certifies performance on energy use**
- **Ratings validated by third party professional engineer**

ENERGY STAR BUILDINGS



Aegion Center, Louisville

**3,569 buildings
rated nationally**

**11 buildings rated
in Kentucky**

TYPES OF BUILDINGS RATED

Office (General)

Office (Bank Branch)

Office (Courthouse)

Office (Financial Center)

Hospital

Hotel/Motel

K-12 School

Medical Office

Supermarket/Grocery Store

Dormitory/Residence Hall

Refrigerated/ Unrefrigerated

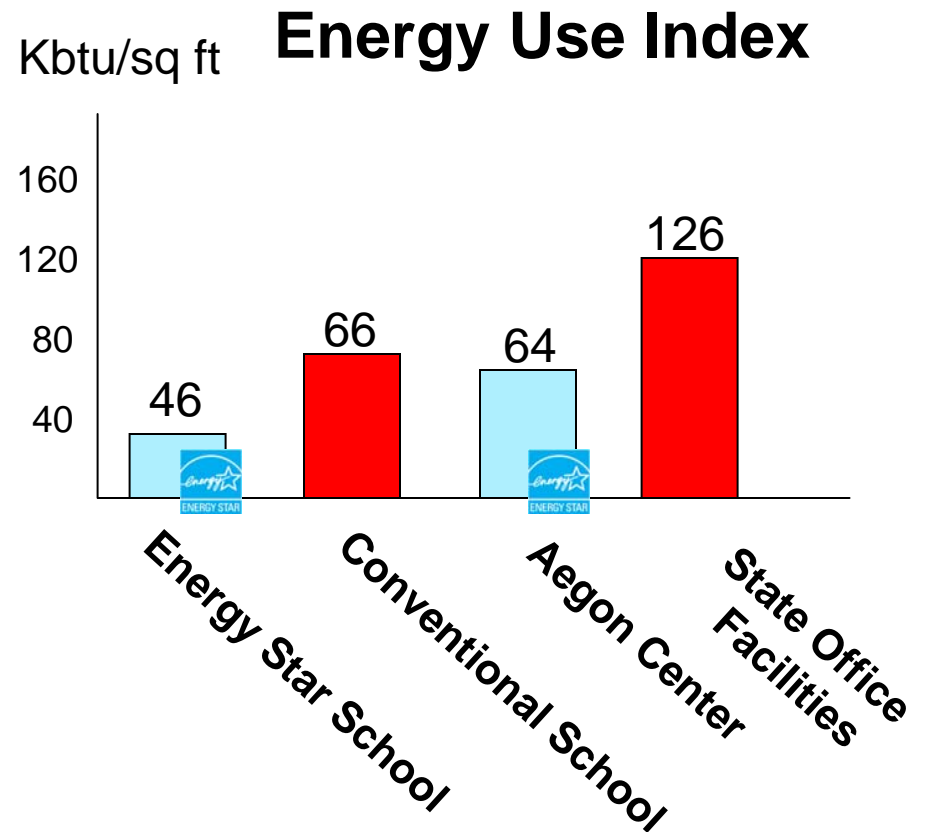
Warehouse

ENERGY STAR BUILDINGS



Kentucky ENERGY STAR schools use 30% less energy than conventional schools

Aegon Center uses 49% less energy than the average for state owned office facilities



LEED BUILDINGS



The U.S. Green Building Council is a coalition of building industry leaders working to promote buildings that are environmentally responsible, profitable and healthy places to live and work.

Leadership in Energy and Environmental Design (LEED) - The LEED Building Rating System® is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings.

LEED BUILDINGS

LEED

- define “sustainable building” by a common standard of measurement
- promote integrated, whole-building design practices
- recognize environmental leadership in the building industry
- raise consumer awareness of green building benefits
- third-party certification

LEED BUILDINGS

Builders earn ratings for their construction and renovation projects based on the number of sustainable strategies

LEED Categories

Sustainable sites

Water efficiency

Energy and atmosphere

Materials and resources

Indoor environmental quality

Innovation and design process

Rating	Points
Certified	26-32
Silver	33-38
Gold	39-51
Platinum	> 52

LEED-NC Buildings

Distribution by Geography

200+
100–199
50–99
20–49
1–19

5,000+ building projects
registered or certified

AK = 10
HI = 16
PR = 1



Message to Take Home

Ask for Sustainability !

**Build to a Standard...
Measure to that Standard**

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